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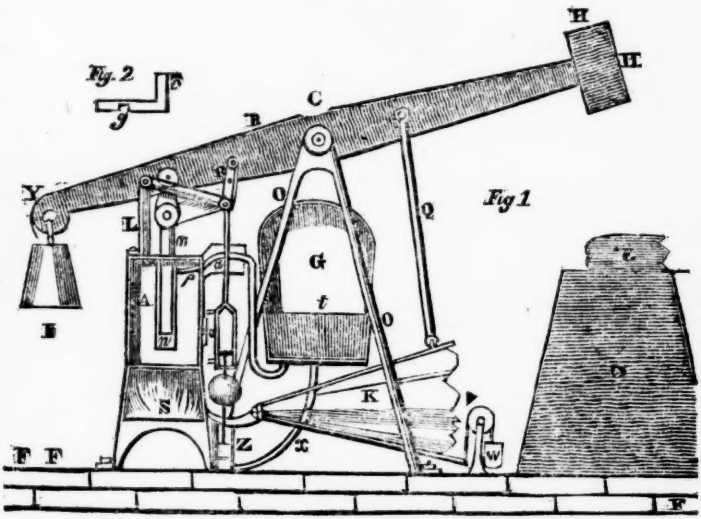
However bad the world may be, the extremes of wickedness are to be found among those who do not read.—KNOX.

STEAM FORGE HAMMER.



STEAM FORGE HAMMER.

The above Figure is from the *London Mechanics' Magazine*, representing a simple and cheap mode of attaching the engine to forge hammers, and may prove advantageous to some of our enterprising countrymen who are erecting forges in situations where water is not always to be had in sufficient quantity for the propelling the machinery.

Description.

A the cylinder, the bottom *n* which is kept very hot by the fire in the stove S.

B the beam, vibrating on a centre.

C the centre.

D the anvil.

E the iron to be forged.

FFF the foundation or floor for the machine to rest on.

G a cistern, filled with water as high as *t*, and the remaining part with air.

H the hammer.

I a weight, heavy enough to lift the hammer, and overcome the friction of the machine.

K a pair of smith's bellows, inverted, which receives motion from the beam B, by means of the connecting rod, Q.

L an upright shaft, fastened to the top of the cylinder A, to which the rod of the parallel motion, P, is fixed.

R a rod to let water into the cylinder, move the forcing pump, Z, and let steam out of the cylinder. This rod has a hole in it about one eighth of an inch long; and when the hammer is at its greatest height, as is shown in the figure, this rod is at the bottom; the hole *a* comes opposite to the pipe *p*, and allows the water to be forced out of the cistern G, into the cylinder A, (which is made air tight at top, *m*, and rather broader in the inside, to allow the water to pass to the bottom, *n*,) which is immediately converted into steam, and thus gives a very great force to the hammer.—This rod at the same time shuts the communication with the atmosphere, by means of the pins *xx*, and crank *e*, more fully exhibited in fig. 2.—When the end, Y, of the beam is at the top, the bottom pin *x* lifts up the crank *c*, and allows the steam to pass through the groove *g*, (which is made in the steel cock *cg*, exactly to the centre) into the atmosphere, and allows the piston to descend. The piston of the forcing pump Z is also lifted by this rod by the catch *f*—but as the beam descends, it does not force down the piston, but lets the weight *w* force the water up the pipe T, according as it is consumed.

w a cock for stopping the engine.

DISAGREEABLE NOISE.

We are glad to see that our Corporation have interfered to prevent the noise and confusion created by the ringing of steam boat bells, enjoining it upon the owners that no steam boat bell shall be rung before sunrise for more than two minutes at a quarter of an hour before starting, and for one minute at starting It is a very appropriate and wise act—but what we wish more particularly to draw their attention to at present, is not the sound of a bell rung for half an hour two or three times a day, but to a very unpleasant and rumbling noise proceeding from a shed in the yard of the Bull's Head Tavern, and continuing almost without intermission from sun rise to 10 o'clock at night, similar to what might be expected to proceed rom an empty hogshead with a large sheepskin stretched over it, on which a bear, babboon or elephant might be attempting to give us some imitation of martial music, accompanied with the dying groans of wild beasts, produced by running a pitchfork in their hides—amusing enough, no doubt, to the audience, but not to distant hearers!———Suppose, that instead of confining the act to the ringing of bells, it should be made to embrace all unpleasant and disagreeable noises, it would be of a much more republican character, and greatly oblige the neighbourhood in question.

SIR—I will be much obliged to some of your numerous Correspondents to inform me, through the medium of the Mechanic's Magazine, if it be the fact, which I have met recorded in some scientific work, the name of which, and particulars of the case, I have now no recollection of, that quicksilver stands supported, in a Torricellian Tube, at times, as high as seventy inches. It is said to be only accidentally so, but the phenomenon cannot happen without a cause; and when it is recollected, that the barometer never ascends, from atmospheric pressure, to thirty-five inches (which one would suppose is the canse in both instances,) I confess it puts my faith in the recital to no small trial. Seventy inches of quicksilver, giving seventy feet ascent of water, is what no pump sinker ever obtained yet. Being anxious to investigate the subject, I have searched many philosophical works lately, but could meet nothing of the case; yet being strongly persuaded it is mentioned as having taken place, and, of course, is worthy investigation, I beg to solicit your publishing this my request, to be in-

formed whether it is the fact, and on what principles it takes place,

As my last Hope.

THE CANAL.

From the Albany Daily Advertiser.

David Thomas, engineer, and his company have prosecuted the Auburn and Owasco canal route, so far as to ascertain the height of the summit level, which is 806 feet. The fall creek is on the summit level, and will afford an abundant supply of water. The summit of the Skaneateles route is 834 feet, and by way of the Nine Mile Creek, 829 feet. The objection to the Ithaca route is that the Cayuga Lake is difficult and dangerous for boats to navigate.

CANAL TOLLS.

From the Cayuga Patriot.

We are assured, from good authority, that the tolls for the season will be at least 500.000 dollars—this will be 100,000 dollars more than was estimated by the commissioners of the canal fund. Last year the amount of tolls was 289,320 58—thus giving an increase to this year of at least 210.670 42 cents. So much for the enterprise of the people of New-York.

THE HIRUNDA FULVA.

From the Kaleidoscope.

The tawny coloured swallows of North America are only now beginning to approach the dwellings of man. They preserve in this new abode the social habits which distinguish them in the solitudes in which they live in numerons troops, executing common labours, rendering mutual succour, attacking and defending themselves at the same time. These habits have entitled their species to the name of the 'republican swallow.' Their troops sometimes consist of several hundreds of pairs; and every thing proves that they are united by an instinct of sociability; for there are occasionally to he found solitay and silent pairs confining themselves to the desert—consequently, it is not to any common want that the associations formed by the greater number of these birds is to be attributed. There is no time to lose if it be thought desirable, by accurate and closely followed up observations, to ascertain the present condition of the species, in order one day to compare it with what it will become after its introduction into cities. According to Buffon, beavers had acquired in the solitudes of America, by the necessary effect of the instinct of association, certain faint arts, which they lost when the invasions and power of man dispersed them, and reduced them to live more in families. Will the innocent republic of swallows be more fortunate? Will it find an asylum among a people who owe it, by so many titles, favour and protection? Will it lose the industry which has procured for it the name of *birundo opifex:* or will it become still more skilful in its labours of construction? Will it employ more solid materials, &c.? Such are the inquiries which will certainly not be neglected in America.

DEAF AND DUMB.

The New-Jersey institution for the instruction of the Deaf and Dumb, lately endowed by the legislature, will be the first in the union, if not in the world. In addition to almost every branch of instruction, acquired with astonishing rapidity under a new system, the principal, Mr. Seixas, has an extensive farm about four miles from Camden, under a high state of cultivation, where the scholars are industriously employed at stated hours, in every branch of agriculture, and at the same time acquiring a practical knowledge of botany, &c. thus engrafting labour upon science, promoting health and wisdom, and snatching unfortunate mutes from a state of darkness to light, and all the uses and benefits of light and intellect.

THE BEST METHOD OF MAKING BRONZE.

Take spelter, and let it stand in spirits of wine for twenty four hours; then pour off the solution, and let it

evaporate, and boil it with three ounces, by measure, of sintum senega, for two hours; then take it off, and strain it through a fine rag, which will detain the fine powder, to be well washed with clear water, previous to using. The method of darkening the bronze is by simply adding chloride of ammonia, mixed with asphaltum; the mixture to be applied while hot to the brass or copper. It has also been successfully applied to copper and steel.

PATENT PLOUGH.

Mr. Finlayson, of Edinburgh, has lately invented a patent plough, the cutting edges of which are kept as sharp as can be done with a file; and from their length, and the oblique angle which they present to the resisting force, completely cut where the resistance is great, but where the soil or moss is too soft to give sufficient resistance for to cut, all the small roots, &c. easily slip off, so as never to be any impediment to the progress of the plough.

The advantages and superiority of this plough over any other, are described in the "Edinburgh Farmer's Magazine," as follows:

This implement has now been sufficiently tried in Scotland and England to prove—what has not been attempted to be denied—that it is superior to any other in use in this kingdom.

The plough, from its self cleaning property (which no other has) and being in every other respect as well fitted and proportioned as the most approved ploughs in this country, has the advantage at certain sorts of work in the finest and driest soils, and there even, where the best modes of rotation are followed.

Wherever, again, the land is adhesive and wet, or foul with weeds, or covered with long stubble, dung, or sea ware—or, in short, where other ploughs are apt to get entangled, and frequently stopped, it possesses, for the above reason, a very great superiority.

With these advantages, and the set of irons for waste, moor, and bog lands, being more appropriately constructed than any before in use, it is, on such soils, as good as three ordinary ploughs, in regard to ease of draught, cost, and speed of work; and as every plough, (independent of the stoppages,) becomes heavier to drag, and makes bad work when choked or entangled by vegetable matter, the quality of the work done by the patent self cleaning plough keeps pace with the other savings of time and cost.

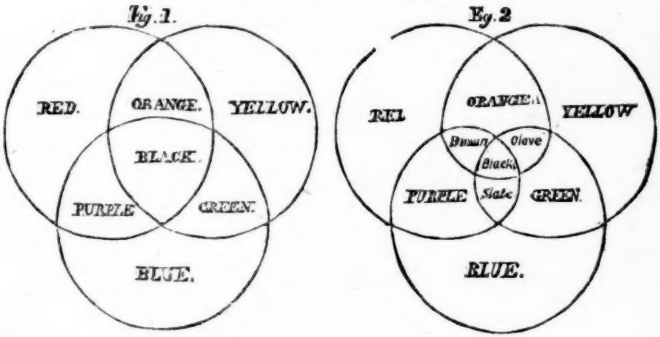
But as this plough is so efficacious in reclaiming waste lands, and in working other rough foul lands, it is held by some, from analogy, that it cannot be suitable in fine well cultivated districts. After what I have already said, my short answer to this is, that it is superior to any other plough used in Great Britain, on any soil, and this I assert, not only because it can be supported by mechanical demonstration, nor because of my own experience, but because it is borne out by the attestations of the most enlightened practical agriculturists wherever the implement has gone.

I myself reclaimed fifty acres of the worst description of bent moss, at one hundred feet above the level of the sea, within the last three years; and my outlays were within that time fully remunerated, and I left the land permanently a thousand per cent. higher in value. I can show the same results in a thousand places in the counties of Ayr, Lanark, Renfew, and Dumfries, where my plough and system have obtained ground.

The improvements that have taken place in these counties merely within the last five years, and in which I have been mainly instrumental, will remain worth thousands of pounds annually of increased value.

DIAGRAM OF THE PRIMITIVE COLOURS.

From the London Mechanics' Magazine.



SIR,—In the year 1810, I invented *my* Equilateray Diagram of the three primitive Colours, so composed as to produce the *seven* colours by the three *primitives* only, which I *lent* to the publisher of a small book on the art, as a part of a plate of diagrams which formed the frontispiece.

In 1813, I published my first edition on *Perspective* Drawing and Painting, wherein I introduced the above diagram, as it stands in the 14th plate of that work; when a gentleman disputing my claim brought me the *manuscript* of Harris's book on colours; which work, although in print, and dedicated to Sir Joshua Reynolds, I had never heard of; but, to my great satisfaction (for my book was published.) I found Harris no forwarder than all others that I had or have seen on that point of illustration which should prove how the three primitives were to be disposed, so as to give the seven colours thereby. Yet this I am bound in truth to say, that had Harris's two diagrams been like the one which I have (for ought I know) invented, I might have been silent on the subject without loss to his *readers*, for his letter press is both clear and conclusive. But as soon as he has told us that the red, blue, and yellow, will produce green, orange, and purple, he gives us the first diagram of three equilateral triangles; here we see but the three colours and black; we are informed of the compounds which may be produced, and then a second diagram is given, like the first; but the tints introduced are green, orange, and purple, with a black centre, as before. These three, we are again informed, produce (by mixture of two together) brown, olive, and slate tints, which he explains by circumscribing his diagram with circles and subdivisions (according with my 4th diagram, plate XIV., first edition, for the Primitives,) and passing the colours gradually round, out of one into the other, till in each intermediate division between any two *principal* colours, the declared production is certainly found (if well coloured.) This method certainly does show the practitioner how to make the tint he may require, but the root of the matter is not clearly displayed by his two *centre* diagrams.

This left me triumphantly easy with regard to the advance I had made, and I saw no further illustration necessary, otherwise I should not have repeated my *second* and *third* editions without an endeavour to attain it. Still Mr. Harris's "*brown, olive*, and *slate tints*," *appeared* to be wanting to make my *pet-invention* complete, which I am so fortunate as to have accomplished by the preceding Diagram, figure 2.

This diagram might be drawn at *one stroke of the pen*, if it could be guided perfectly.

Let it be understood that my original diagram still comprehends the whole that has been advanced by my ultimate scheme, if my third paragraph of Letter XIV. be received as a practical guide to using the colours on the 4th diagram of my plate on colours, in either edition. H. C.

TENACITY OF IRON AS APPLICABLE TO CHAIN BRIDGES.

From the same.

The following results have been deduced from experiments made in Russia, and detailed by M. Lamb, in a letter from Petersburgh, *Ann des minar*, x. 311. In the apparatus contrived for the purpose the power was applied by a hydraulic press.

The best iron tried supported 26 tons per square inch, without being torn asunder. The bars began to lengthen sensibly when two-thirds of this power had been applied, and the elongation appeared to increase in a geometrical ratio with arithmetical increments of power. The worst iron tried gave way under a tension of 14 tons to the square inch of section, and did not lengthen sensibly before rupture. By forging four bars of iron of medium quality together, an iron was obtained which did not begin to lengthen until 16 tons had been applied, and supporting a weight of 24 tons without breaking.

Taking these results as sufficient data, it was decided by the committee appointed for the purpose, that the thickness of chains in a suspension bridge should be calculated so that the maximum weight to be borne should not exceed 8 tons per square inch of sectional surface, and that, before being used, they should be subjected to a tension of 16 tons per square inch, and bear it without any sensible elongation.

THE SINGLE WHEEL CLOCK.

From the same.

SIR,—Having sent to your valuable journal for the promulgation of mechanical science, an account of a very simple Clock, or rather Time-piece, in my possession, consisting of only one wheel, and which you were pleased to publish in vol. 1. I have since observed in your Miscellany, that one of my brother subscribers, dated Royston, states that he has made a clock agreeably to my given plan and principle, but that he is much disappointed to find it did not answer, as, when the barrel was wound up, it unwound itself in two minutes, and could not, by any weight, be prevented from thus rapidly descending. I have, in consequence thereof, more minutely examined the clock (which I have made) and I find little difference in the dimensions which he has given of the proportionate lengths and diameters of the works, except that the wheel diameter may be called five inches; but this difference I do not look upon as material. Being determined, however, to ascertain the reason of the failure, I have accordingly dissected the barrel containing the liquid which unwinds the catgut off the spindle, or rather arbor, and I find the tin barrel is divided into five cells, having five tin partitions soldered in at equal distances, which cells or divisions are continued to within 1-8th of an inch of the arbor or spindles, so that they are all open to each other, and the water can pass out of one cell to the other running out at the small opening next the arbor, I also observe there is a small hole, not larger than the smallest shot hole, in the centre of each tin division within a quarter of an inch of the outer rim; this I conclude is for an air vent. These divisions, by letting the water flow only gradually, constitute, I imagine, the grand secret of its being enabled to keep time, the same being checked again by the hook and line passing round the grooved wheel, and balanced by shot. I have also to observe that I found the barrel, when opened, to contain about half a pint of fetid water, strongly impregnated with verdegris from the materials of the barrel. The water is put in after the barrel and divisions are all nicely soldered, by a small hole in the side near the

entrance of the arbor, the hole being afterwards soldered up.

Your obliged servant, B—P—C—

ON THE EMPLOYMENT AND WORKING OF ANIMAL HORN IN GENERAL

BY M. VALLET.

[*Translated from the French.*]

From the same.

Horn, particularly of oxen, cows, goats, and sheep, is a substance soft, tough, semitransparent, and susceptible of being cut and pressed into a variety of forms; it is this property that distinguishes it from bone. Turtle or tortoise shell seems to be of a nature similar to horn, but, instead of an uniform colour, it is variegated with spots. These valuable properties being known, renders horn susceptible of being employed in a variety of works fit for the turner, comb and snuff-box maker. The means of softening the horn need not be described, as it is well known to be by warmth; but an account of the cutting, polishing, and soldering it, so as to make plates of large dimensions, suitable to form a variety of articles, may be desirable. The kind of horn most to be preferred is that of goats and sheep, from its being whiter and more transparent than the horn of any other animals. When horn is wanted in sheets or plates, it must be steeped in water, to be able to separate the pith from the kernel, for about fifteen days in summer, and a month in winter; and when it is soaked, it must be taken out by one end, and well shook and rubbed, in order to get off the pith, after which it must be put for half an hour into boiling water, and then taken out and the surface sawed even lengthways: it must again be put into the boiling water to soften it, so as to render it capable of separating, then, with the help of a small iron chisel, it can be divided into sheets or leaves. The thick pieces will form three leaves; those which are thin will form only two, whilst young horn, which is only one quarter of an inch thick, will form only one. These plates, or leaves must again be put into the boiling water, and when they are sufficiently soft, they must be well worked with a sharp cutting instrument, to render those parts that are thick, even and uniform; it must be put once more into the boiling water, and then carried to the press.

At the bottom of the press employed there must be a strong block, in which is formed a cavity of nine inches square, and of a proportionate depth; the sheets of horn are to be laid within this cavity in the following manner, at the bottom:—First a sheet of hot iron, upon this a sheet of horn, then again a sheet of hot iron, and so on, taking care to place at the top a plate of iron even with the last, and the press must then be screwed down tight.

There is a more expeditious process, at least in part, for reducing the horn into sheets, when it is wanted very even. After having sawed it with a very fine and sharp saw, the pieces must be put into a copper used for the purpose, and there boiled until sufficiently soft, so as to be able to be split with pincers: then bring quickly the sheets of horn to the press, where they are to be placed in a strong vice, the chaps of which are of iron and larger than the sheets of horn, and screw the vice as quick and tight as possible; let it then cool in the press, or it is as well to plunge the whole into cold water. The last mode is preferable, because the horn does not dry up in cooling. Now draw out the leaves of horn, and introduce other horn to undergo the same process. The horn so enlarged in pressing is to be submitted to the action of the saw, which ought to be set in an iron frame, if the horn is wanted to be cut with advantage, in sheets of any desired thickness, which cannot be done without adopting this mode. The thin sheets thus produced must be kept constantly very warm, between plates of hot iron, to preserve their softness, Every leaf must be loaded with a weight heavy enough to prevent its warping. To join the edges of these pieces of horn together, it is necessary to provide strong iron moulds suited to the shape of the article wanted, and

to place the pieces in contact with copper-plates, or with polished metal surfaces against them; when this is done, the whole is to be put into a vice and screwed up tight, then plunged into boiling water, and after some time i. is to be removed from thence and immersed in cold water, which will cause the edges of the horn to cement together, and become perfectly united.

To complete the polish of the horn, the surface must be rubbed with the subnitrate of bismuth by the palm of the hand. The process is short, and has this advantage, that it makes the horn dry promptly.

When it is wished to spot the horn in imitation of tortoise shell, metallic solution, must be employed, as follows. To spot it red, a solution of gold in aqua regia must be employed; to spot it black, a solution of silver in nitric acid must be used; and for brown, a hot solution of mercury in nitric acid. The right side of the horn must be impregnated with these solutions, and they will assume the colours intended. The brown spots can be produced on the horn by means of a paste made of red lead, with a solution of potash, which must be put in pieces on the horn, and subjected some time to the action of heat. The deepness of the brown shades depends upon the quantity of potash used in the paste, and the length of time the mixture lays on the horn. A decoction of Brazil wood, a solution of indigo, with sulphuric acid, a decoction of saffron, and Barbary tree wood, is sometimes used. After having employed these materials the horn may be left for half a day in a strong solution of vinegar and alum.

In France, Holland, and Austria, the comb makers and horn turners use the clippings of horn, which are of a whitish yellow, and tortoise shell skins out of which they make snuff boxes, powder horns, and many curious and handsome things. They first soften the horn and shell in boiling water, so as to be able to submit them to the press in iron moulds, and by the means of heat form it into one mass. The degree of heat necessary to join the horn clippings must be stronger than that for shell skins, and which can only be attained by experience; the heat must not be too great, for fear of scorching the horn or shell. Considerable care is required in these operations not to touch the horn with the fingers, nor with any greasy body, because the grease will prevent its joining perfect. Wooden instruments should be used to move them while they are at the fire, and for carrying them to the moulds.

NEW METHOD OF BLEACHING SPONGE.

From the same.

To bleach Sponge and render it perfectly white, it is necessary to soak it in cold water. But if it does not become soft, it must be immersed in boiling water; but this should, if possible, be avoided, for it has a bad effect on the sponge; particularly in cooling, it causes it to shrink and to become hard, and so tough as to prevent its being bleached; but if the sponge is soaked in cold water, and that water be changed three or four times every day, and every time the water is drawn off, the sponge should be pressed perfectly dry; this process being repeated for five or six days, it will, at the expiration of that time, be ready for bleaching.

If the sponge, as is frequently the case, should contain small pieces of chalk and shells, which cannot be got out without tearing it, the sponge must be soaked for twenty-four hours in muriatic acid, with twenty parts of water, which will cause an effervescence to take place, and carbonic acid gas to be liberated, when the shells and chalk will become perfectly dissolved; after that it must be carefully washed in fresh water, and immersed in sulphuric acid, the specific gravity of which must be 1,024 or 4 deg. on the hydrometer of Beaume. The immersion of the sponge in this acid should continue for about eight days, but it must occasionally be pressed dry and thoroughly washed. After having been perfectly washed and cleaned, it should be sprinkled with rose water, to give it a pleasant smell, which completes the process.

HINT TO VARNISH MANUFACTURERS

From the same.

SIR,—A thought lately struck me, that a strong iron vessel (something like Mr. Perkins's steam-generator but much less) might be advantageously employed in the manufacturing of Varnish. Amber and copal make the best hard varnish, but they are exceedingly difficult to dissolve, owing to their requiring a greater heat than turpentine or spirits of wine will bear without evaporating. The latter, indeed, is so volatile, that I do not believe they were ever dissolved in it alone; and it is said, that only two or three persons in this country can make copal varnish properly

As water, when confined, can be heated to almost any degree, I see no obstacle to hinder us from heating the usual menstruums of varnish in the same manner. They are more volatile, but we have only to make the vessel stronger. The gums, no doubt, would be better for being crushed and mixed with the spirit, before they were put into the vessel.

Your obedient servant, W——.

CURE FOR SMALL-POX.

From the same.

At a late Meeting of the French Royal Academy of Medicine, M. Velpean read a Memoir to prove that, if the pustules of the Small-pox are cauterised within the first two days after their appearance, they die away entirely; and if this be done even later their duration is abridged, and no traces of them left. The caustic he employs is a solution of nitrate of silver in which he dips a probe, with which he pierces the centre of each pustule. M. Dumeril says that he has been long familiar with this practice, but, instead of the solution, he employed the solid caustic itself.

REAPING CORN. [Wheat.]

From the same.

The French claim the merit of a new discovery of great importance to agriculture in the advantages which, according to them, result from the practice of reaping corn before it is perfectly ripe. This theory, which has just been promulgated by M. Cadet de Vaux, originates with M. de Salles, of the Agricultural Society of Beziers. The following are the particulars:—Corn reaped eight days before the usual time is, in the first place secured from the dangers which threaten it at that time—this is only accidental; but a positive advantage is, that the grain is fuller, larger, finer and that it is never attacked by the weevil.

The truth of these statements has been proved by the most conclusive comparative experiments upon a piece of corn, one-half of which was reaped before the usual time, and the other half at the degree of maturity fixed by the ordinary practice. The first portion gave a hectolitre of corn more for half a hectar of land. Afterwards, an equal quantity of flour from the wheat of each portion was made into bread; that of the corn reaped green gave seven pounds of bread more than the other in six decalitres. Lastly, the weevil attacked the corn which was cut ripe, the other was exempt from it. The proper time for reaping is that when the grain, on being pressed between the fingers, has a doughy appearance like the crumb of bread just hot from the oven, when pressed in this manner.

PERPETUAL MOTION ON PHILOSOPHICAL PRINCIPLES.

SIR,—The following is copied from a foreign work; should you consider it worthy publication, it is much at your service.

R. W. DICKINSON.

"The power is at present applied to the machinery of a clock; this clock, unconnected with the power, is calculated to go for two years without winding up, by the weight of a single pound, that gives motion to a pendulum of twenty pounds, which moves through a space of 518,400 inches in 24 hours, while the small maintaining weight (a single pound) descends only 1-10th of an inch. The

internal work of the clock consists of three wheels. In order that the superiority of this movement may be obvious to every understanding, as well as to those more conversant with the more difficult parts of mechanics, it is necessary to mention, that the common eight-day clock requires a weight of fourteen pounds, where this only requires a weight of one, is wound up once in eight days, and moves a pendulum of three pounds and a half, when this moves one of twenty, and is wound up only once in two years. In twenty-four hours the maintaining weight of the common clock descends six inches; in this it descends only 1-10th of an inch. The least weight which we at present recollect to have heard of being used by the first artist of London is five or six pounds, where this requires only one, in consequence of the diminution of friction. So far it has been thought necessary to describe this clock in comparison with the common one.

"We now come to that part to which extraordinary merit is to be ascribed —the faculty of winding itself up without the intervention of human power. This faculty is derived from the weight of the atmosphere, and can never cease (under the conditions after mentioned) while the machine lasts, and while a column of air either loses or gains 1-50th part of its common weight five times in the space of two years, the time which the clock goes without requiring any assistance, or, in other words, as long as the change of the weight of the air, five times in the space of two years shall be such as to cause the mercury either to ascend or fall 2-10ths of an inch in the barometer above or below its mean height. The wearing out of wheels, or of any kind of machinery by friction, never can be avoided; accordingly, it has never been required in the discovery of a perpetual motion. It is therefore sufficient, on that subject, to say, that the present machine, upon a fair comparison of its friction with that of the common clock, would probably move five centuries, a period sufficient for any purpose that can be required."

IMPROVED SYSTEM OF EDUCATION ESTABLISHED AT HAZELWOOD SCHOOL.

From the Kaleidoscope.

The system of education at Hazelwood School, near Birmingham, presents to the contemplation a moral phenomenon of no ordinary interest. It is one of the boldest and most original experiments ever made upon the youthful mind in any age or in any country, and we feel pretty confident that its result will be to produce a frank, manly, intelligent, and patriotic race of men. In laying before our readers the following epitome of the system, we can assure them that we have not acted upon the suggestion or solicitation of any person concerned in the seminary: they are perfect strangers to us; and we understand that they have no need of the commendation or recommendation of the public press. The school is not only uniformly full, but it is with the greatest difficulty that new pupils can gain admission at any time. The epitome of the mode of education practised at that interesting seminary will put our readers in possession of the mere outline of that singular and origiual system, which is marked by many peculiarities not adverted to in the prospectus. Amongst these is the establishment of a magazine, written, edited, and printed by the scholars themselves. We shall probably avail ourselves of an early opportunity to give some extracts from this little work, of which we have been favoured with four numbers, containing compositions in prose and verse in English, and occasionally in French. There are, besides, some very clever designs drawn, etched, and printed by the pupils. In fact, this school appears to combine the *utile dulci;* and we cannot conceive a greater treat for the philanthropist than a visit to Hazelwood. Before we proceed with the subjoined epitome, we shall transcribe the following passage from the *Liverpool Mercury*, as expressive of our opinions of the system pursued at our head colleges.

We have long been of opinion, that the system of education pursued in some of our boasted universities, was

calculated rather to form pedants than philosophers and scientific men. Too much importance is often attached to literary attainments, which are rather ornamental than absolutely essential; while some useful, and even indispensable, branches of education are either imperfectly communicated or utterly neglected.

One of the most profound scholars of the day once observed of the University students, that "their quantity of knowledge was the knowledge of *quantity*;" and Mr. Campbell the great advocate of the new London University, after relating a curious circumstance of an Oxford Professor being nonplus on the Continent for want of knowing French, and being relieved by a girl of fifteen who spoke the language, observes, "that our boarding school girls receive an education in many respects more available for the present state of society, than the learning of university graduates."

AN EPITOME OF THE SYSTEM OF EDUCATION ESTABLISHED AT HAZELWOOD SCHOOL.

Drawn up, at the request of some teachers desirous of adopting this method, wholly or in part.

The object of the Hazelwood system of education is to form active, intelligent, and honourable members of society. One of the principal means which have been taken to obtain this end, is the establishment of a form of government among the teachers and their pupils, by which the powers of the former and the rights of the latter are well defined, and by which a very large portion of the duties of the legislator and the judge devolves upon the pupils.

The greater this portion, the more perfect will be the system. In adopting such a system, however, perfection should not be attempted suddenly. It may be well to begin by throwing the judicial part of the burden of government upon the shoulders of the pupils, the instructor enacting the laws himself. Let the next step be to render the tribunal elective at the suffrage of the boys. The master may now call a council of his leading pupils, and consult them on the framing of the laws. The council may soon become a representative body, and be gradually invested with legislative powers. The master must now, as a member of this committe, AND A MEMBER ONLY, learn to digest his proposed enactmens with great care, to support them with ability, to receive with candour the suggestions of his pupils, and lastly, when he finds himself in a minority, to bear his disappointment with temper. In time, the more intelligent among the representatives will themselves frame and propose laws; but the master must not be discouraged, if years elapse before his pupils take much of the burden of the INITIATIVE.

The elections ought to recur at very short intervals; a month is a term of sufficient length. It cannot be too strongly impressed on the master, that the powers of which we have spoken, are to be surrendered *bona fide*. He must sedulously forbear all influence, but that of mind; if his measures are carried, it should be only because they are more ably devised or more eloquently supported than those of his pupils, and not because they are the offspring of POWER. The merit of regulating a complicated machine may be great; but how much greater is the praise of constructing a machine which has the capability of regulating itself!

The foregoing outline shows, though perhaps but faintly, by what means boys may be taught to govern themselves as a community. It remains to be seen how they may be led to govern themselves individually; that is, to gain habits of useful exertion and self control; for no man is free in the true sense of the word, under whatever form of government he may live, until he is released from the power of tyrannical habits and passions. Much will be done towards this great end by the arrangements already proposed, Such a frame of government offers inducements to those who would take a lead in the affairs of their little community, to cultivate and acquire such information and manners as will make them acceptable to their fellows. The

legislator must obtain confidence in his wisdom, the judge in his probity and his knowledge of the laws, and the juror in his impartiality. Then again, the example of these public officers, holding as they do the first places in the consideration of their constituents, is naturally very powerful.

Here are generous motives offered to view; such as will continue to act when the school boy has become a man, and they must not be counter acted by others less respectable or lasting.

The great evil of the common methods of education is the harsh coercion to which the pupil is constantly subjected. Blows, public disgrace, long imprisonment, heavy tasks, and scurrilous invective,—these are the means but too commonly adopted, for implanting, in the young mind, a fondness for learning, habits of industry, virtuous principles, honourable feelings, and a gentlemanly demeanour. Can we wonder that such causes do not produce their intended effects? It is true, there must be punishments: at least we are afraid so; but of this we are sure, that, under an enlightened system, they may be made very much less frequent and severe than can readily be conceived by those whose experience has been confined to the usual methods of governing young people.

A child who is exposed to harsh discipline, cannot be operated upon by the higher motives. He is like the slave under the lash, who in time becomes almost as brutal as his master. It has been found in practice, that little punishment beyond a few light fines, is necessary to preserve a very high degree of order among a large number of boys. The boys are enabled to pay their fines thus: they have hours of leisure, in which they are induced to engage in some useful employment, by a remuneration, paid in a coinage which is received in liquidation of fines, and with which they also purchase various little immunities. In the choice of occupation, each boy follows the direction of his own taste and judgment.

By this arrangement, two great advantages are obtained; first, a mode is secured by which every boy may provide himself with a fund to meet the various calls which the heedlessness and volatility of youth are sure to render necessary; and, secondly, a strong motive is furnished to the pupil, for useful employment, at his own hours and under his own guidance; or in other words, for taking lessons in the invaluable arts of self government and self education.

We have not space for a detail of the methods employed in the Hazelwood system, to simplify the various branches of instruction, and render them acceptable to the pupil. The principle which has been kept in view, is, that it is always better for the pupil to LEARN than to be TAUGHT; therefore, the exertions of the instructor should be sedulously directed to induce, in the mind of the pupil, a love of knowledge, and the habits necessary to its acquisition. To accomplish this end, he will find it necessary to form a strict alliance with the WILL of his pupils. To force information upon them in opposition to their wishes, he will consider as labour in vain. Not conquest, but friendship, must be the object of every endeavour.

The means which have been found most efficacious in producing this desirable result, are—first, to indulge the disposition inherent in man, as a gregarious animal, for social employment. Let every study, as far as it is practicable, be followed in classes; by which plan, the master will gain the collateral advantage of economizing his own time. Let his pupils manœuvre with military order and exactness; performing their various evolutions to the music of a band, chosen from those of their own body, who are gifted by nature with the requisite powers for acquiring the art. The spirit, the regularity, and the saving of time and of temper, which will flow from this arrangement, will amply reward the teacher for all his labour in drilling his young performers. The next care of the teacher should be, that the pupil is left to encounter no difficulty so great as to create dis-

gust; and here, social study will be peculiarly advantageous. as it gives the teacher an excellent opportunity for marking the operations of the pupil's mind, and thus adapting his task to his powers. Strength and clearness in the impressions conveyed to the mind of the pupil, will have great effect in creating and enhancing his love of knowledge; and no means ought to be despised which promote this important end. We can only mention one, which is too often overlooked by teachers; and that is, to address the senses of the pupils, whenever it is practicable. Let them feel the various weights, and see the different measures, of which the writers on arithmetic make use; let their garden be stored with the plants of which they read, and their library with drawings or models of such objects of interest as cannot themselves be procured.

Finally, let the teacher omit no opportunity of showing his pupils the utility of the information which they have obtained. Let those, for instance, who are sufficiently advanced in their mathematical studies and in the art of drawing, make surveys, and reduce them carefully to maps and plans.

Such is the outline of the Hazelwood system of education; and the teacher who may feel tempted to adopt its plans, will at least have this security, that he will not be drawn into the arduous, if not hopeless task, of reducing to practice an untried theory of the closet; he may rest assured, that scarcely any thing is here proposed but what has been accomplished by others, and is at this moment in full and successful operation.

We cannot hope that the outline here given will suffice to enable a teacher to adopt the whole of the Hazelwood system of education, without farther information on the subject; such information, however, may be obtained from a work entitled "Plans for the Government and liberal instruction of boys in large numbers," or more completely, from a visit to the school itself, which, except in the vacations, from about the middle of June to near the end of July, and from the middle of December to that of January is at all times open to the inspection of intelligent visiters.

NOTE.—Since we wrote the foregoing article, we have met with a paper in the *Edinburgh Review*, for January last, expressly on this subject, from which we make the following extract, in proof of the fact that this system works well. The Reviewer gives it as the report of a very intelligent friend, who had inspected the whole of the Hazelwood establishment, of which he speaks in the following terms:—"The most striking circumstance, perhaps, is the universal cheerfulness, and the kindly terms which they are on with the masters. I had abundant opportunity of satisfying myself that this was sincere.—There was also an air of hearty attention to their business, which I never saw in any other school—no langour—no yawning—but all activity, and abstraction from every thing but the lesson. They all seemed to go about their work like persons who knew their business, and had no doubts about success; and the frequent changes from topic to topic kept this degree of animation always afloat. The various musterings, ringing of bells, music and marching, which certainly in the book appear a little like trifling and loss of time, are in practice excellently adapted to maintain good order, and are all performed so rapidly, that, although I was quite familiar with the description, and was warned by the master from time to time what was going to be done, I could not, sometimes with the closest attention, follow these movements. In a written description, it will sometimes happen that what in fact is the work of a moment, and must be performed in some manner at every school, occupies as much space, and is as prominently put forward, as the essential instruction which these mere forms are but the preparation for. And I think it right to state, that after seeing the whole proceedings of a day, I am not aware that any of those musterings, and other arrangements, having punctuality as their object, could be dispensed with

without harm. The music consists of a band of twelve boys; their instruments are the same as those used by military bands; and they play extremely well. The study of music, of drawing, of fencing, and several other similar accomplishments, is quite voluntary. The play hours of the boys are occupied partly in mere play, but chiefly in objects having some useful end in view. They have a printing press of their own, and publish a monthly magazine, embellished with etchings on copper, and lithrographic prints, all executed by the boys. Reports of their trials are given at length —the school discipline is canvassed —accounts of the expenditure of their funds are drawn up in a business like manner, and, in short, the whole system is a curious epitome of real life. It is extremely important to remark, that all this, being quite general, the every day business of their lives, produces no coxcombry amongst the boys. They are not converted, as I had apprehended they would be, into little men. They are still boys, but boys with heads and hands fully employed on topics they like. They were all very neatly dressed, and remarkably clean and tidy—all rosy and healthy looking, and merry as any children could be at home. The house is thoroughly ventilated—their library is well arranged and catalogued. It is managed, like every thing else, exclusively by the boys. Every body is allowed to propose any book for purchase, and the name is submitted to a committee, who decide.

THE PHILADELPHIA BREAKWATER.

From Noah's Advocate.

The Philadelphia Gazette is positive that the proposed Breakwater, at the mouth of the Delaware will not only prove of vast utility, but that circumstances will so resuscitate the commerce of Philadelphia as to bring it back to its pristine vigor and importance. We hope so—but natural causes, not removable by the Breakwater, will continue to check the commerce of Philadelphia, while the same causes, and sound capital, will make that city, and the whole state of Pennsylvania, the emporium of American manufactures. The Gazette, in giving reasons for the decay of commerce, observes—

The principal causes of the decrease of the (foreign) commerce of Philadelphia, have been the want of demand abroad for flour, the staple produce of Pennsylvania, and the bankruptcy of the western states, and also of the interior of our own state. The first cause of course, diminished exportation, the second importation. A domestic trade has now taken the place of the foreign, and in proportion as the country generally recovers from its pecuniary embarrassments, Philadelphi must flourish.

It is admitted above, that foreign commerce is lost to Philadelphia, and is superceeded by domestic trade, which we presume, is the coasting trade. If, therefore, supplies of staple articles can be procured from Philadelphia, without a navigation of 300 miles up and down the Delaware, it no doubt be preferred; therefore, for foreign or domestic trade the costly Breakwater will be of little service. The Gazette further says—

To suppose that the commerce of a city thus situated will not increase, and increase greatly, is absurd in the extreme. Equally absurd is it to suppase that the whole trade of this immense country can be passed through such a ditch as the Raritan Canal. It would be happy for us, indeed, if we could follow the course pointed out by the Advocate, and thus avail ourselves of all the advantages New-York possesses as a shipping port; but the Raritan Canal will never be able to pass more than a small portion of the produce of the country on the Delaware alone, and the charter of the company expressly prohibits the construction of another canal, or even of

a rail road, an the direct line of communication between this city and New-York.

The Delaware and Raritan Canal, in consequence of the immense trade between New-York and Philadelphia, will be much wider than ordinary canals, and have a set of double combined locks to prevent delay. The canal boats will be constructed to carry heavy freights and to navigate the Delaware, and also our bay. As the distance for canalling is short, it will doubtless be rendered as complete as possible; and with respect to the facilities of the "big ditch," we would remind the Gazette that similar calculations relative to the grand canal placed our calculations and discernment in the back ground. It is therefore safe to say, that for the distance, the Delaware and Raritan Canal will be more valuable, and convey a greater portion of trade than any in the world, and will dobtless be the medium through which a great portion of the Philadelphia trade will pass—rendering an expensive project at the mouth of the Delaware, however desirable, still comparatively of little value. If the trade of Philadelphia finds its way to the ocean through the Delaware and Raritan Canal, it answers every purpose: so that it finds its way out, it is no consequences through what channel.

VARIETY.

From Various Papers.

Don Manual Simon D'Escudero, formerly a member of the General Congress of Mexico, charged, it is said, with propositions to regulate with the government, an internal intercourse between the countries by a claim of military posts, &c. passed Nashville, where a dinner was given him by the Texas Association, on the 22 ult.

A circumstance quite uncommon in the north, lately happened in Scania. A woman at work in the fields laid her infant on the ground, at a little distance: soon after an eagle pounced upon the infant, and carried it away. The poor woman, who heard the cries of the child in the air, is become insane, and is now in the hospital at Malmoe.

The president's Message was conveyed from Washington to Baltimore by express, a distance of 37 miles in one hour and three quarters.

A letter from Guayaquil, by way of Jamaica, states that the steamboat Felica, Captain Michal Mitrovitoh, is now plying between the ports of Lima, Guayquil and Panama, as a regular Packet.

A hog was sold in Boston on Thursday, weighing 625 lbs. being 16 months and one week old, and was raised by Mr. Russel in Ashburnham. This animal was remarkably fat, of a crossed breed, very small boned, and measured across the shoulders twenty two inches. Several Gentleman, acquainted with the qualities of the hog examined this animal, and agreed that it was one of the fattest and handsomest ever brought into this market it was sold for seven cents per lb.

The total amount of coinage at our Mint since its first establishment, is only 23,650,502 dollars; a sum entirely inadequate to the demands of a trading community like that of the U. States—averaging in gold, silver and copper, for a national circulating medium, scarcely two dollars a head for an increasing population.

INQUIRIES.

Sir—It would very greatly oblige me if any of your intelligent readers would inform me of the mode of gilding old picture frames in oil gold—whether there is any method of varnishing them with gold varnish, so as

to look well and stand? The great expense of frames in this country deprives those who are not rich of the pleasure of ornamenting their rooms with their own paintings or drawings, and consigns many a good old family picture to the garret, from the shabbiness of its frame.

It has occurred to me that some ingenious correspondent might make frames of metal, lackered as they do ornaments for chairs, ; they would be durable, light, and cheap. Mouldings might be made of any convenient length, and various breadths and patterns, so as to be cut and jointed to any size wanted. Mouldings for rooms might also be made much less expensive than the present gilt ones.

SIR—I will thank some of your correspondents to inform me of the best form and materials for a small furnace to melt from one to three pounds of metal, in a room.

SIR—A tradesman has just commenced business, and to the surprise of all his customers, has only four weights with which he can weigh any number of pounds from one to forty. I should like to know the right weights, doubting not of their great utility to others as well as to myself.

METEOROLOGICAL TABLE.

	Thermometer 8 in the morn	Thermometer noon	Thermometer 10 at night	Remarks
Dec. 24—Saturday	32°	38°	36°	cloudy rain
25—Sunday	41	46	37	rain
26—Monday	31	38	24	clear
27—Tuesday	25	39	32	clear
28—Wedns'y	30	44	33	clear
29—Thursday	37	39	37	cloudy
30—Friday	39	40	41	storm–rain

At the request of a number of our Subscribers we have commenced the above Meteoroligical Table, showing the variation of the Thermometer, Morning, Noon, and Night, each day, which we propose to publish at the end of every week.

EDITOR.

TO CORRESPONDENTS.

The article from *Hiram* shall appear in our next.

Communications for the 'American Mechanics' Magazine' post paid, and addressed to

C. S. WILLIAMS,

No. 252 Broadway, will receive due attention.